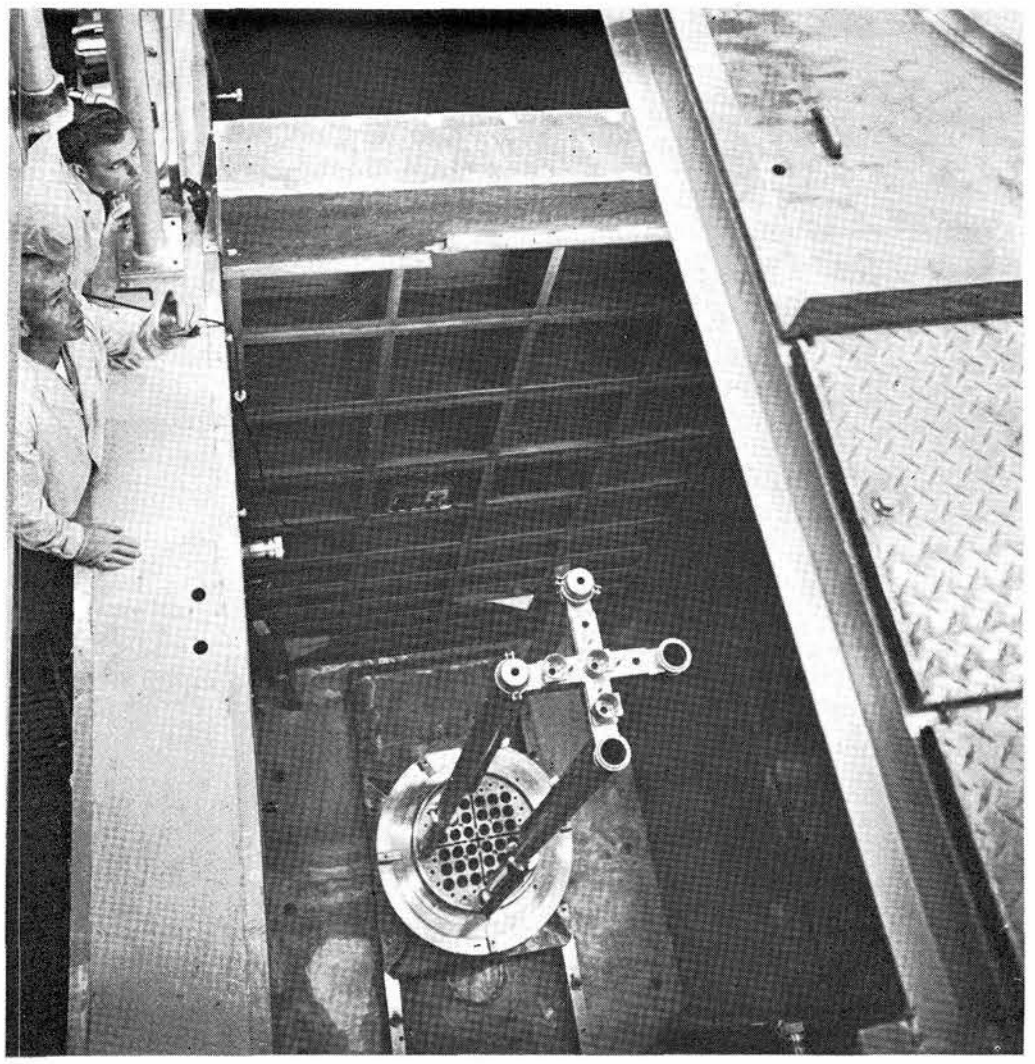
SANDIA CORPORATION

LAB NEWS

PRIME CONTRACTOR TO THE ATOMIC ENERGY COMMISSION / ALBUQUERQUE, NEW MEXICO / LIVERMORE, CALIFORNIA

VOL. 17, NO. 3 / JANUARY 29, 1965



SNARE REACTOR is shown during assembly of the device. It is mounted in a 16-ft. deep pool of water with about 12 ft. of water covering the top of the core. Control rods extend about 10 ft. above the surface of the water. Control instrumentation is located on a balcony above the pool. At left are Roy Tackett of Reactor Division and Louis H. Sanders of Environmental Health Division.

Sandia's Low-Powered SNARE In Self-Contained Chain Reaction

A new reactor went into service at Sandia Laboratory early last week after receiving an official approval from the Atomic Energy Commission's Division of Military Application in Washington, D. C., to start operations.

A self-sustained chain reaction was achieved in the Sandia Nuclear Assembly for Reactor Experiments (SNARE) at 12:44 p.m. Tuesday, Jan. 19.

SNARE, a low-power reactor, is the third reactor operated by Sandia. The Sandia Engineering Reactor (SER) was placed in operation in October 1962 and the Sandia Pulsed Reactor (SPR) started operating in June 1961. All of the reactor facilities are operated by Reactor Division under P. D. O'Brien. The reactors are located in Sandia's Technical Area V, a remote restricted site five and one-half miles south of Sandia Laboratory headquarters.

SNARE is designed for low power (one kilowatt maximum) operation. It will be used primarily to investigate reactor measurements, or alternative core configurations, for the five-megawatt Sandia Engineering Reactor. Modifications proposed to improve the capability of SER can be completely engineered at SNARE. This will permit almost uninterrupted use of SER, the larger reactor, for radiation effects studies.

Nineteen enriched uranium fuel elements, each about 42 in. long with 24 in. of active fuel, have been loaded into the new reactor to achieve the self-sustained chain reaction.

The reactor core is mounted in a 16-ft.-deep pool of water, with about 12 ft. of water covering the top of the core. Control rods and other equipment extend about 10 ft. above the surface of the water.

SNARE originated at the AEC's National Reactor Testing Station in Idaho where a reactor named SUZIE was used for precise measurements. Upon completion of its program there, it was declared surplus and shipped to Sandia Corporation the latter part of 1963. New components were added and some modifications were made to construct SNARE.

Sandia Papers Given At Physical Society Meeting in New York

A number of Sandia Laboratory men presented technical papers at the American Physical Society meeting in New York City, Jan. 27-30. Included were:

R. C. Heckman of Inorganic Materials Science Division, "On the Conductivities of the Neodymium-, Erbium, Holmium-, and Ytterbium-Hydrogen Systems."

D. H. Anderson of Applied Research Division, "Pressure Dependence of the Nuclear Magnetic Resonance of Co^{59} in Ferromagnetic Cobalt to 60 Kilobars."

R. A. Graham, D. H. Anderson, and J. R. Holland, all of Applied Physics Research Department, "Evidence for Pressure Enhancement of Antiferromagnetic Order in 30 Per Cent Nickel-Iron Alloys." Mr. Graham made the presentation.

G. W. McClure of Atomic Interactions Research Division, "Differential Angular Distribution of H and H+ Dissociation Fragments of Fast H_2+ Ions Incident on H_2 Gas."

T. A. Green of Atomic Interactions Research Division, "Proof of Detailed Balancing for the Impact Parameter Method."

R. I. Ewing of Atomic Interactions Research Division, "Electron Emission from Tungsten under Proton Bombardment: Effect of Nitrogen Absorption."

Sandia Lab Earns High Honors for Fire Prevention

Fire prevention activities of Sandia Laboratory's Plant Engineering Department have been judged fifth best in the nation in the annual contest sponsored by the National Fire Prevention Association. Sandia was competing in the industrial category against 151 other entries.

In past years, Sandia has placed high in the contest but this year's honors are the highest yet. Last year Sandia was 11th in the contest.

Judging was on the basis of an entry form and a scrapbook of fire prevention activities. Categories of judging included a year 'round inspection program, fire prevention organization activities, year 'round employee fire control education, National Fire Prevention Week and other educational campaigns conducted, and results of the program.

R. W. Cohrs of Field and Plant Operations Engineering Division organized the material for the scrapbook. The book was prepared by Judy Elder of Technical Art Division. Ward Hunnicutt is supervisor of Field and Plant Operations Engineering Division, which has responsibility for Sandia's fire prevention program.

Magazine Publishes Article on Plant Engineering, Maintenance

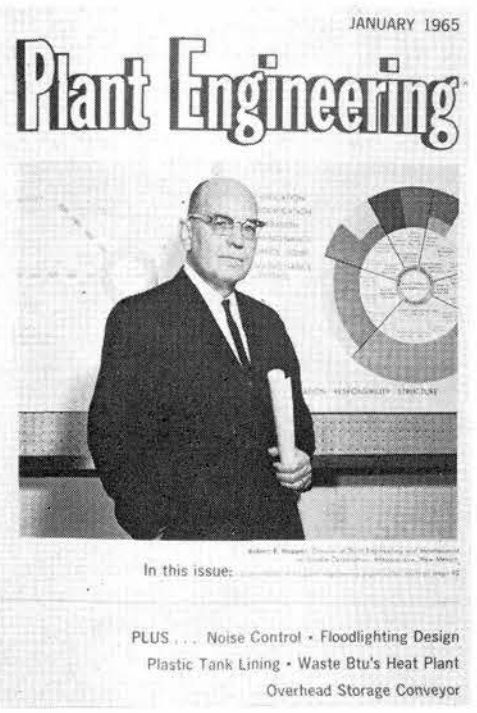
The story of Sandia's Plant Engineering and Maintenance Organization and of its Director, Robert E. Hopper, is told in the cover article of the January 1965 issue of **Plant Engineering** magazine.

The magazine's construction editor some months ago visited Sandia to discuss a series of technical articles to appear in future issues of the magazine. While touring the facilities and talking with members of the Plant Engineering and Maintenance Organization about the future articles, he decided to write about the entire operation.

He was impressed with one unique aspect of this plant engineering and maintenance group—that of maintaining and designing equipment and facilities to "keep up" with research and development advances and being flexible enough to perform immediate modifications.

The article outlines the functions of Sandia's Plant Engineering and Maintenance Organization and the responsibilities Mr. Hopper has in directing a staff of 600, administering an annual budget of $2.8 million, and being in charge of facilities worth $130 million.

Pictures accompanying the article and the cover photo were taken by B. K. Laskar of Public Relations and Employee Publications Department.



UNITED COMMUNITY FUND AWARDS went to eight Sandia Laboratory organizations which achieved a high percentage of participation and Fair Share contribution. The awards, silver plaques and gold certificates, were presented by Sandia Corporation President S. P. Schwartz to secretaries who accepted for their co-workers. From left are Eleanor Slutts, Patent Department, gold certificate; Laurie Krebs, Public Relations and Employee Publications Department, gold certificate; Muriel Denison, Military Liaison Organization, silver plaque, and Field Force Department, gold certificate; Mary Adair, Quality Assurance Department, silver plaque; Jane Thompson, Wage and Salary Administration Department, gold certificate; Lois Merriam, Electromechanical Development Department II, silver plaque; and Fay Taylor, Systems and Procedures Department, silver plaque. The gold certificates were awarded organizations of less than 50 persons who achieved 90 per cent participation, 90 per cent Fair Share contributions. Silver plaques were awarded organizations of greater than 50 persons who achieved 90 per cent participation, 75 per cent Fair Share.

UNM Seminar to Help Secretaries Get Business Background

A business administration seminar for professional secretaries will be held at the University of New Mexico, beginning Feb. 8. Registration forms are available in Sandia's technical library.

The non-credit seminar will enable secretaries to secure a foundation in business administration and to acquire knowledge in one of the six topics required for the Certified Professional Secretaries examination. The seminar is offered by the university in cooperation with the Albuquerque Chapter of the National Secretaries Association.

There will be 12 class meetings from 7-9 p.m. Mondays. The instructor will be Mrs. Virginia Reva, UNM Associate Professor of Business Administration.

The study area includes applied economics, management, and elements of business operation.

Further information may be obtained from M. H. McMichael, Assistant Director, UNM Division of Extension, tel. 243-8611, ext. 208.

(Editorial Comment)

The Rewards of Giving

The memories of Christmas '64 linger with us and some will long remain. These lasting memories are being enjoyed by those who lived the holidays as they are intended to be lived. Hundreds of employees are now treasuring expressions of warm appreciation extended by those they helped. It is hard to determine who is happier. Is it the benefactor or is it those who were the object of the benefaction?

The many indications of sincere gratitude are typified by a letter dated Jan. 4, which came to one Sandia organization. Here are excerpts:

> "As neither of us has a job we would not have been able to buy even one-third of what you gave us. We do not know just how to thank you and the others who have helped us. Nor do we know how to tell you how much it means what you have done for us and our family.
>
> "We will pray for you all and ask our Good Lord to bless you and grant you good luck, health, and prosperity now and always."

Seldom is so eloquent a Christmas thank-you letter written. Seldom is a giver so amply repaid.

Let there be no doubts about the value of the Sandia employee Christmas program.

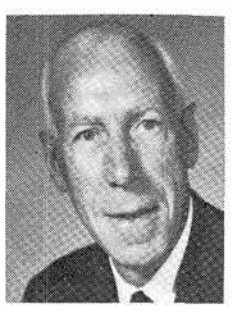
Service Awards

15 Years

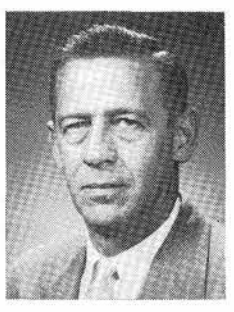
James S. Hinson
3242
Jan. 30, 1950

C. A. Ashby
3223
Feb. 1, 1950

George E. Mincks
8222
Feb. 1, 1950



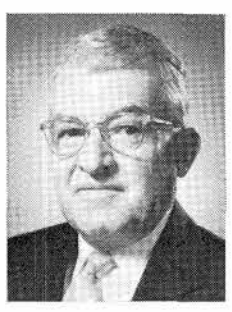
T. T. Robertson
2200
Feb. 1, 1950



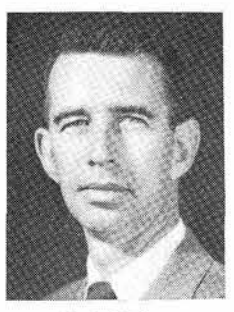
Watson M. Snyder
7223
Feb. 1, 1950

Sally Ann Moore
3427
Feb. 2, 1950

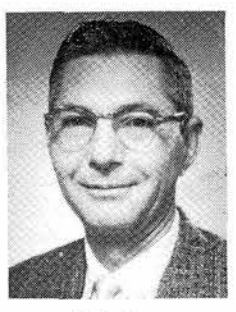
Jesse A. Floyd
8222
Feb. 3, 1950



Hubert R. Hanen
2452
Feb. 6, 1950



H. C. Walker
7265
Feb. 7, 1950



E. T. Gay
2411
Feb. 8, 1950

Edward J. Vulgan
2453
Feb. 12, 1950

10 Years

Jan. 30 - Feb. 12

Louise S. Winner 7521, Robert E. Quinlan 2412, R. J. Brousseau 7254, N. A. Bourgeois, Jr. 1414, Charles T. Radigan 2213, John J. Driscoll 7532, Edgar F. Richardson 2444.

Rose F. Cazier 1540, Simeon D. Teisher 9225, Alburtia Stevens 2231, George H. Smith 8141, Richard S. Cook, Jr. 8163, Bette J. McKenzie 3428, Mary Ellen Sisler 5230, William F. Carstens 3410, and Beatrix Schowers 3462.

AEC Receives Bids for Construction to Sandia's Static Jig Facility

Apparent low bidder at $18,187 to construct a storage addition to the Static Jig Test Facility operated by Area I Laboratory Division in Bldg. 864 is Edwin F. Cillessen, general contractor, Albuquerque.

The project will include construction of a storage addition approximately 40 ft. long, 20 ft. wide, and 12 ft. high to the existing building; providing heating and sprinkler systems, electrical lighting, power and intrusion alarm; and some modifications to street lights and circuits.

Work on the project is to be completed within 75 days after the contractor is notified to proceed by the AEC. Plant Engineering Department project engineer is R. G. Piper.

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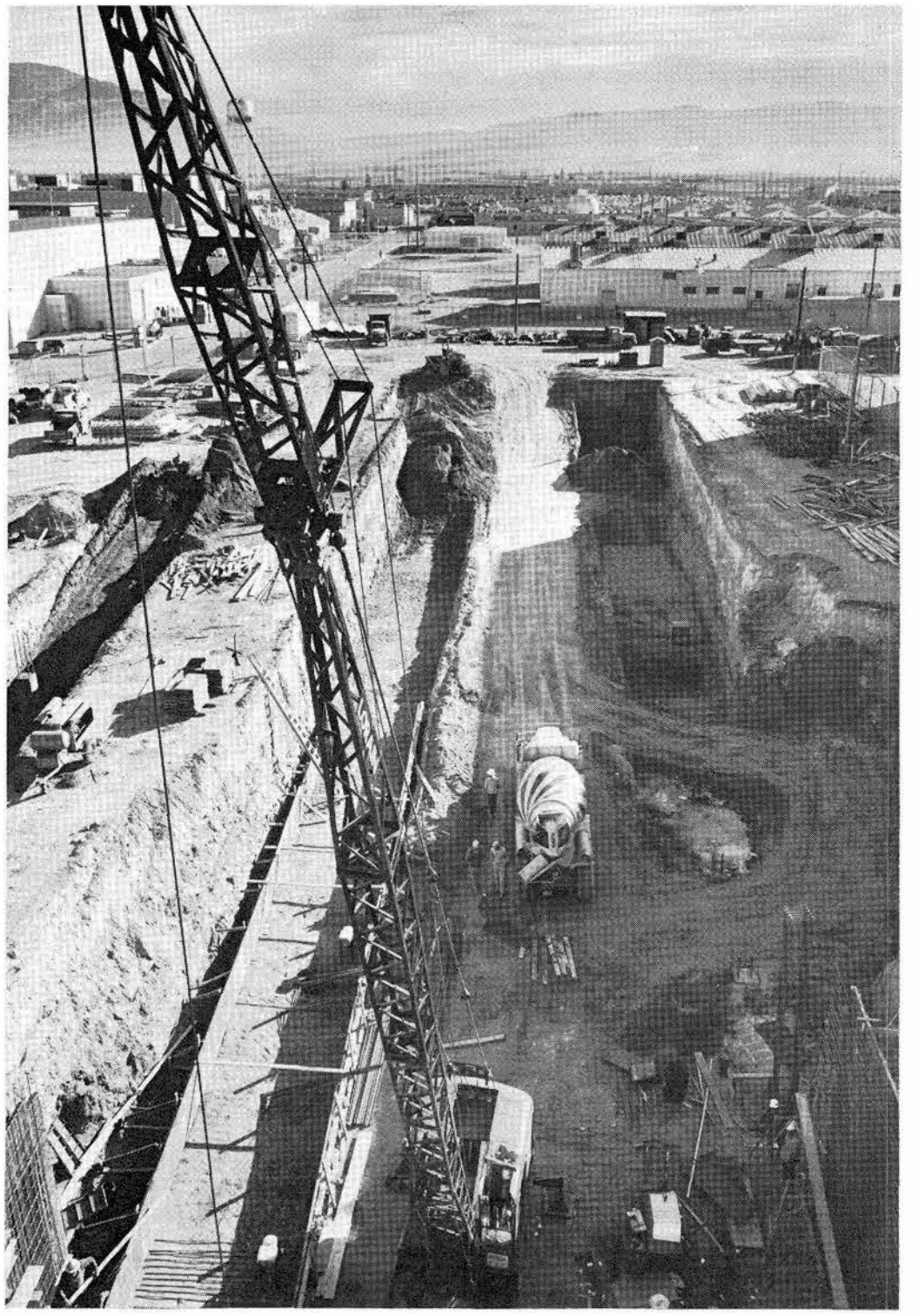


BLDG. 807 CONSTRUCTION currently in progress includes laying the foundation and basement concrete and construction of a utilities service tunnel. Photo was taken from the roof of Bldg. 806 which the new three-story laboratory building will adjoin. Scheduled completion date for Bldg. 807 is December 1965. C. R. Morrisett is the Plant Engineering Department project engineer.

NEW OFFICERS—Installed recently as 1965 officers of the Metal Trades Council were, from left, Walter F. Myers of Machine Shop Division 4253, president; A. N. "Tony" Chaves of Evaluation Division A, secretary-treasurer; and Joseph A. Maldonado of Packaging-Shipping and Commercial Inspection Division, vice president. The terms of office are for one year.

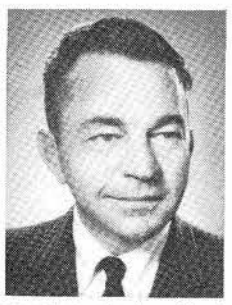
Supervisory Appointments

PASQUALE A. PORTOLESE to supervisor of Computer Operations Section, Numerical Applications Division, Livermore Laboratory, effective Jan. 16.

Pat has been at Livermore since June 1959. Some of his work assignments during this time included stock analyst, order analyst, and P&S coordinator. In January 1964 he transferred to Management Systems and Computer Operations Division as a programmer. Most recently he has had the staff lead and responsibility for computer operations in Numerical Applications Division.

A graduate of Modesto Junior College, Pat received his Associate of Arts degree in mathematics and the physical sciences in 1962. He attended the IBM 1410 COBOL Programming Course in September 1963 and the 1410 Monitor and Disc Training Course in March 1964.

Pat served from 1954-56 in the U. S. Army, stationed in Alaska.



REYNOLDS R. MOORE to supervisor of Projects Division, Upper Atmosphere Projects Department, effective Jan. 16.

Since coming to Sandia nearly 14 years ago, "Ren" has worked on weapons development projects. He has been a section supervisor since 1957.

He previously was with a consulting engineering firm in Washington, D. C.

Ren attended Purdue University and the University of Maryland, receiving his BS degree in mechanical engineering from the latter. He is a registered professional engineer in New Mexico.

He served three years in the Army Air Corps.

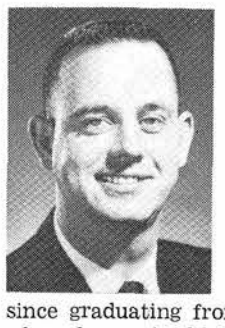
WILLIAM D. ZINKE to supervisor of Applied Mechanics II Division, Preliminary Design Department, Livermore Laboratory, effective Jan. 16.

Bill was hired at Sandia Laboratory in October 1957 and has worked in structural analysis throughout his career at Sandia. He transferred to Livermore Laboratory in June 1958, and in October 1962 was promoted to supervisor of Structural Analysis Section

He graduated from the University of North Dakota in June 1955 with a BS degree in civil engineering and has done graduate work at the University of North Dakota, San Jose State College, and the University of California at Berkeley.

Before coming to Sandia, Bill was employed in structural analysis for two and a half years in the Transport Division of Boeing Aircraft Corporation, Renton, Wash. An Army veteran of two and a half years, he served in the medical and transportation corps in Fort Lewis, Wash., and Korea.

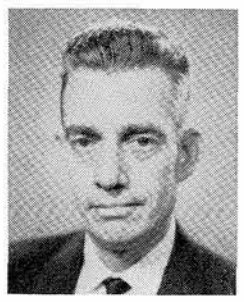
He is a member of Sigma Tau, engineering honorary society, and Sigma Xi, scientific honorary society.



JOHN S. ANDERSON to supervisor of Component Development Division, Product Development Department, Livermore Laboratory, effective Jan. 16.

John has been at Livermore Laboratory in project groups and test projects work since graduating from Oregon State College where he received his BS degree in electrical engineering in 1957. He was promoted to section supervisor in a Project Engineering Division of Preliminary Design Department in October 1960.

He is a member of IEEE; Sigma Tau, engineering honorary; Eta Kappa Nu, electrical engineering honorary; and Pi Mu Epsilon, mathematics honorary. From 1948 to 1952 John served in the U. S. Navy.

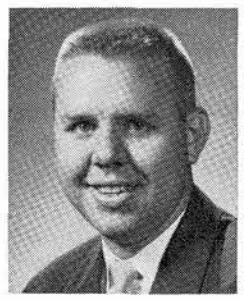


H. M. DUMAS, JR., to supervisor of Seismic Systems Division, effective Jan. 1.

He has been at Sandia eight and a half years and has headed a section in Electromechanical Development Development I for the past four years. While first assigned to Field Testing, "Brick" participated in Operation Plumbbob and Hardtack, Phase I.

Prior to coming here, he was at the University of Arkansas where he received his BS and MS degrees in physics. He was a member of Sigma XI, science honorary, and Phi Beta Kappa, scholastic honorary.

From 1946-49 he served in the Navy in the field of electronics.

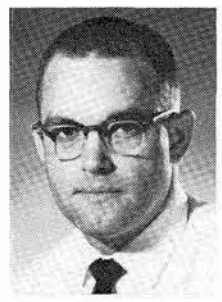


TOM A. SELLERS to supervisor of Instrumentation Division, effective Jan. 1.

A Sandia employee for seven years, Tom has worked in instrument development, tracking systems, and has served as supervisor of a system development section.

Immediately prior to coming here, he was at the University of Oklahoma where he received his BS degree in electrical engineering. He has taken some graduate study at the University of New Mexico. Tom is a member of Eta Kappa Nu and Tau Beta Phi, honorary societies.

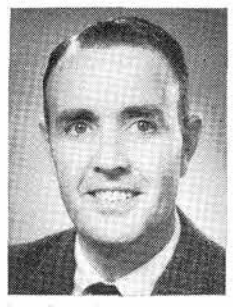
Tom attended the Nike Missile Officers School in El Paso while on active duty with the Army as part of his ROTC training.



ROBERT G. CLEM to supervisor of Special Projects Division, Preliminary Design Department, Livermore Laboratory, effective Jan. 16.

Bob started at Livermore Laboratory in June 1958, immediately following his graduation from Washington State College, Pullman, where he received his BS degree in mechanical engineering. He was assigned to a project group and in October 1960 was promoted to section supervisor in a Project Engineering Division of Preliminary Design Department.

He is a member of Sigma Tau and Tau Beta Pi, engineering societies. From 1953 to 1955 Bob served in the U.S. Army.

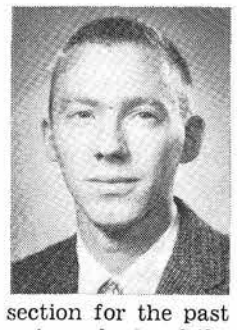


R. WARD HUNNICUTT to supervisor of Field and Plant Operations Engineering Division, Plant Engineering Department, effective Jan. 16.

Ward has been at Sandia nearly 15 years, working first in structural design, and for the past five and a half years serving as a section supervisor.

He has a BS degree in general engineering from North Carolina State University at Raleigh, and is a registered professional engineer in New Mexico.

During World War II, he was in the U. S. Navy.

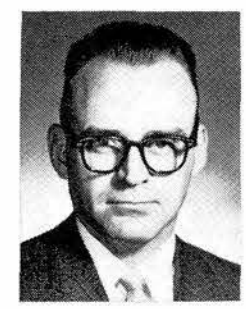


ALBERT F. HUTERS to supervisor of Data Collection System Division, Systems Evaluation Department, effective Jan. 16.

Al has been at Sandia nine years, working in Field Testing since 1960. He has headed a section for the past two years.

A graduate of the University of Missouri, Al has a BS degree in electrical engineering and has done some graduate work.

He is a member of the Institute of Electrical and Electronics Engineers.



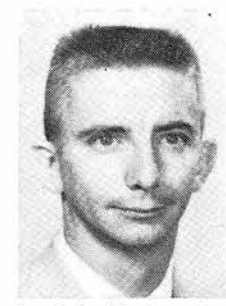
ARLYN N. BLACKWELL to supervisor of Applied Mechanics I Division, Preliminary Design Department, Livermore Laboratory, effective Jan. 16.

After joining Sandia at Livermore in September 1959, Arlyn worked in the structural analysis organization, concentrating on heat transfer studies, and in October 1960, he was promoted to supervisor of Thermodynamics and Dynamics Section.

A graduate of the University of California at Berkeley, Arlyn received his BS degree in mechanical engineering in 1958. He was awarded his Master's degree in heat transfer from the same university in 1960.

Arlyn served from 1953 to 1955 in the Army Corps of Engineers, stationed in San Francisco and Alaska.

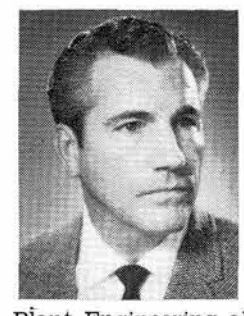
He is a registered professional engineer in California, and is a member of the ASME; Tau Beta Pi, engineering honorary society; and Pi Tau Sigma, mechanical engineering honorary society.



ROBERT J. TOCKEY to supervisor of Test Projects Division, Test Department at Livermore Laboratory, effective Jan. 16.

Bob joined the Company in 1954 working in Electron Tube Development Division at Albuquerque. He was transferred to Livermore in July 1956 and assigned to Nuclear Support Section in Field Operations Division. In August 1959 he was promoted to supervisor of that section.

A graduate of the University of Nebraska, Bob received his BS degree in electrical engineering. He is a member of IEEE; Eta Kappa Nu, electrical engineering honorary; Pi Mu Epsilon, mathematics honorary; and Sigma Xi, scientific honorary society.



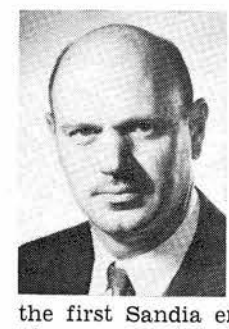
DONALD D. KNOTT to supervisor of Buildings and Facilities Design Division I, Plant Engineering Department, effective Jan. 16

Don has been with Sandia since May 1950 and has headed a section in Plant Engineering almost that long.

Previously, he was an engineering trainee for two years with Allis-Chalmers in Milwaukee, Wis.

He has a BS degree in electrical engineering from the University of Kansas and is a registered professional engineer in New Mexico.

During World War II, Don served in the Army Air Corps.



WILLIAM A. LITTLE to manager of Engineering Services Department, Livermore Laboratory, effective Jan. 16.

After joining Sandia at Albuquerque in July 1951, Bill worked as an electrical engineer in the development organization. He was among the first Sandia employees transferred to Livermore, arriving in September 1955. On Jan. 1, 1956, he was promoted to section supervisor of the Livermore testing and components group and to supervisor of the Test Division at Livermore in October 1957.

Bill graduated from Michigan State College Magna Cum Laude with a BS degree in electrical engineering. During his college years he was elected to the following honorary societies: Tau Beta Pi, engineering; Beta Kappa Nu, electrical engineering; Phi Kappa Phi, all college; and Pi Nu Epsilon, mathematics.

During World War II Bill served as a radio instructor in the Army Air Force at Scott Field, Ill. He is a member of the IEEE.

Sandia Authors

R. A. Hill of Plasmas and Kinetics Research Division, "Vibrational Analysis and Isotope Effects in Hydrogen Selenide," Feb. 15 issue, **Journal of Chemical Physics.**

D. W. Sasser of Applied Mathematics Division, "Quasi-positive Operators," current issue, **Pacific Journal of Mathematics.**

T. W. H. Caffey of Ordnance Test Projects Division I, "Fabrication of a Spherical Coil," January issue, **Review of Scientific Instruments.**

G. H. Haertling of Materials Research Division, "Hot Pressed Lead Zirconate-Lead Titanate Ceramics," December 1964 issue, **Bulletin of the American Ceramic Society.**

D. L. Krenz of System Test Division, "Rover Ocean Impact Simulation," November 1964 issue, **Mechanical Engineering.**

Osborne Milton of Polymer Chemistry and Electrical Properties Division, "Field Solutions and Electric Strength Results for a Molded Equipotential Surface," 1965 Proceedings of **Material Research and Standards.**

M. L. Slater and R. J. Thompson, both of Applied Mathematics Division, "A Permanent Inequality for Positive Functions on the Unit Square," current issue, **Pacific Journal of Mathematics.**

D. C. Wallace of Crystal Physics Research Division and Janice L. Patrick (formerly of Sandia Corporation), "Stability of Crystal Lattices," January issue, **Physical Review.**

L. J. Vortman of Underground Physics Division, "Nuclear Excavation of a Sea-Level Isthmian Canal," November 1964 issue, American Society of Civil Engineers' **Journal of the Waterways and Harbors.**

J. V. Walker of Applied Nuclear Science Division, "An Absolute Thermo Neutron Flux Standard," October 1964 issue, **Nuclear Science and Engineering;** "A Determination of the Cadmium Absorption of Resonance Neutrons in Cadmium-Covered Indium Foils," December 1964 issue, **Nuclear Science and Engineering.**

E. S. Roth of Advanced Manufacturing Development Division, "Let's Stop Interpreting," January issue, **Quality Assurance;** "Phantom Gauge Dimensioning," February issue, **Tool and Manufacturing Engineer.**

Albert Narath of Physical Sciences Research Department, "Antiferromagnetism in $CoCl_2 \cdot 2H_2O$: I. Magnetic Structure," November 1964 issue, **Physical Review;** "Spin-Wave Analysis of the Sublattice Magnetization Behavior of Antiferromagnetic $CrCl_3$" January issue, **Physical Review;** "Magnetization Behavior of Antiferromagnetic $CoCl_2 \cdot 2H_2O$ and $CoBr_2 2H_2O$," December 1964 issue, **Journal of the Physical Society of Japan;** "Proposed Model for the Metamagnetism of $CoCl_2 \cdot 2H_2O$ and $CoBr_2 \cdot 2H_2O$," November 1964 issue, **Physics Letters.**

Bruno Morosin and J. E. Schirber, both of Electron Structure of Solids Division, "X-Ray Investigation of a High Pressure Phase of NH_4F and ND_4F," February issue, **Journal of Chemical Physics.**

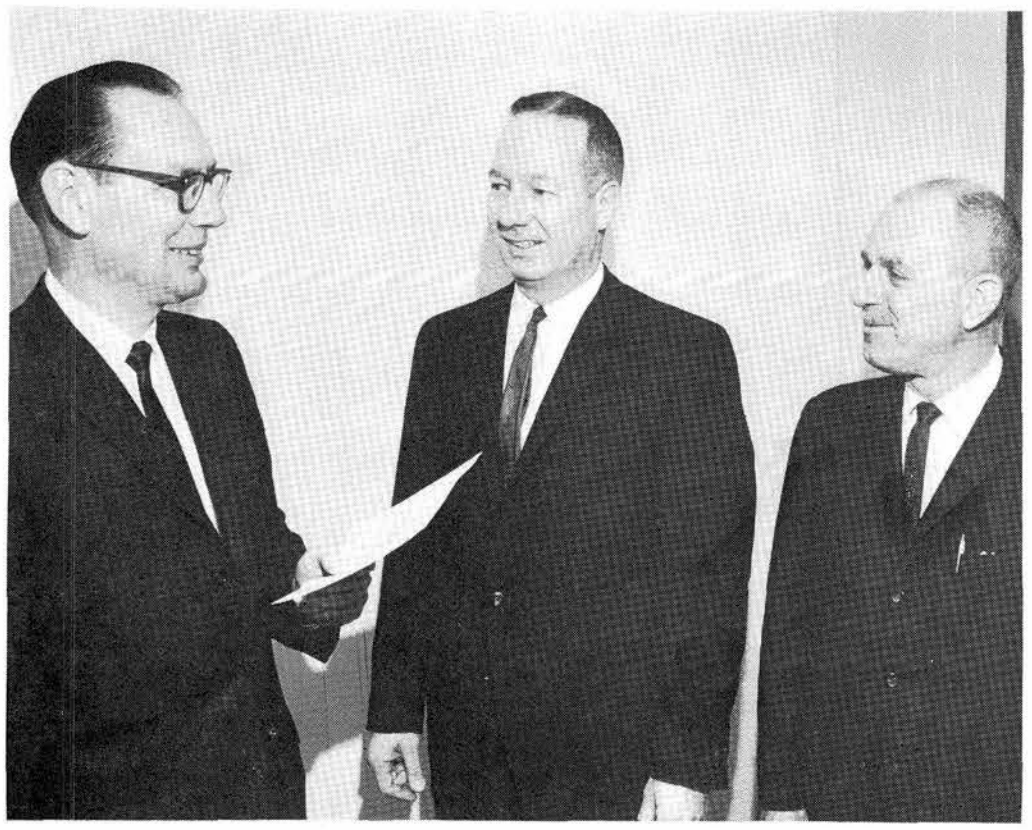
Bruno Morosin of Electron Structure of Solids Division and E. J. Graeber of Analytical Methods Division, "The Crystal Structures of Manganese (II) and Iron (II) Chloride Dihydrate," February issue, **Journal of Chemical Physics.**

H. E. Anderson of Statistics and Components Division, "Automated Plotting of Flow Charts on a Small Computer," January issue, **Communications of the Association for Computing Machinery.**

Take Note . . .

The 35th annual membership campaign for the Albuquerque Community Concert Association will be held from Feb. 8-13. Among the attractions already booked for the 1965-66 season are the Pittsburgh Symphony and the Grand Ballet Classique de France.

Further information about the concert series or regarding memberships may be obtained from Cherry Lou Burns, home tel. 242-2407, or Mrs. J. E. Gross, home tel. 255-7327.



GUEST LECTURER CERTIFICATE held by W. G. Smith was presented to him by Sandia Corporation following his talk to one of the Value Engineering Workshops conducted at Sandia. Center is J. R. Sublett, manager of Advanced Manufacturing Development Department, and right is E. L. Devor, supervisor of Value Engineering, Cost Reduction, and Supplier Evaluation Division. Mr. Smith is value engineering coordinator at ACF Industries, Albuquerque. Employees of Sandia Corporation and ACF Industries have been attending value engineering workshops at both locations. This practice was adopted to help further interchange of information which is necessary because both companies are frequently concerned with the same product.

Maximum Benefits Restored for Two in Health Care Plan

Two Sandia employees, both veterans of 14 years service, recently had their maximum of $15,000 in Health Care benefits renewed when it appeared their benfits were approaching the maximum.

The Benefits and Services Division said the cases were among the first of their type.

Both requests for reinstatement were approved by Equitable Life Assurance Society because each of the persons had returned to full-time work after extended illnesses. Sandia's Health Care Plan provides a maximum of $15,000 with respect to any one individual's lifetime unless new evidence of insurability is furnished. Their return to work constituted "evidence of insurability."

One of the employees, a seriously crippled woman, saw her unused benefits dwindle to only $48 before her $15,000 maximum was reinstated. She had been hospitalized several times.

The benefits of the second employee, a man, were renewed when it was realized his $5200 in benefits could conceivably be exhausted. After the reinstatement, the insured employee submitted bills for hospitalization alone totaling $3150 and doctors' bills exceeding $825.

Congratulations

Mr. and Mrs. Harold Bassett (3415), a daughter, Joanna Davis, Dec. 29.

Mr. and Mrs. R. B. Yingst (2423), a son, Ross Walter, Dec. 30.

Mr. and Mrs. David B. Holt (9313), a son, Paul David, Jan. 10.

Mr. and Mrs. Roger J. Mattson (5223), a son, Brian Alan, Jan. 6.

Mr. and Mrs. R. K. Bump (2131), a son, Michael Francis, Jan. 13.

Mr. and Mrs. C. J. Howard (9225), a daughter, Ginger Lee, Jan. 19.

Technical Writers Presenting Course In University Community College

Fourteen Sandia employees will instruct a 12-week technical writing and publishing survey course next semester for the University of New Mexico Community College. The course will cover subjects such as editor and writer qualifications and responsibilities, training in film script writing, proposals and brochures, manual writing techniques, technical editing, technical illustrating, and writing for teaching machines.

The course is sponsored by the Albuquerque Chapter of the Society of Technical Writers and Publishers. This will mark the third year that STWP members have presented the course. Sandia employees lecturing will be: D. H. Emrick, D. L. Benoist, V. E. Gibbs, A. D. Bertholomey, R. P. Lewis, A. P. Lites, G. C. Hollowwa, Jean La Paz, P. C. House, W. F. Carstens, J. L. Fife, C. A. Tucker, C. S. Johnson, and J. T. Williams. The class will meet Mondays from 7-9 p. m. in Rm. 203 of Mitchell Hall.

There are no prerequisites for the course. Community College registration will be conducted on Monday and Tuesday, Feb. 1-2, from 9 a. m. to 6:30 p. m. in Rm. 209 of the UNM Administration Bldg. Tuition is $15.

Round Dancing Class to Start

Couples interested in dancing are invited to join a beginners class in round dancing. Instructions will be given in basic round dance steps and the round or pattern dances currently being danced in Albuquerque.

The class will meet Tuesdays from 7 to 9 p.m. for 20 weeks beginning Feb. 16 at the Albuquerque Square Dance Hall, Washington and Menaul N.E.

Contact David Barham, tel. 298-2553, for further details.

F. R. Kappel Urges Engineers to Have Deep Sense of Responsibility

AT&T Board Chairman Frederick R. Kappel gave the main address recently at the centennial dinner at the Columbia University School of Engineering and Applied Science in New York.

Mr. Kappel said our economy can make the best possible use of material and technical resources "only if we are able to grow engineers who have a deep sense of responsibility as well as great technical talent.

"I also think we will make the best progress if we will first get rid of a few ideas about engineering that seem to me to be just plain wrong."

Misconceptions about Engineering

"One is the notion that every routine technical task requires an engineer. This idea apparently dies hard. But perhaps one reason why so many engineers get routine jobs is that some of the schools are still turning out routine engineers.

"Another idea I find distressing is that engineers and engineering can make the most progress only when government comes up with colossal plans for them.

"Still another negative notion, in my judgment, is the lingering concept of the engineer as a person who lives on a somewhat less elevated plane than the scientist. According to this view the engineer is a splendid fellow and all that, and goodness knows we could not get along without him, but for all his virtues he still remains the scientist's kid brother. This in my view is a particularly wrong way of thinking.

"Lastly, I deplore the popular attitude that if we could only persuade more young people to be engineers, and they would stay with it, this would give the United States the most gold medals in the engineering Olympics and automatically solve most of our national problems," Mr. Kappel stated.

Need for Engineers Not a Matter of Numbers

The AT&T board chairman said he did not agree that our need for engineers is mainly a matter of numbers, "that the big future depends on multitudes of slide-rule soldiers. Opposed to this is a different view which to me seems far more practical, and which we in the Bell System see growing in influence.

". . . This view recognizes that we have needs, sure enough — but some are much more acute than others. Our leaders at Bell Laboratories feel strongly for example (and they haven't had any trouble persuading me) that by far the most serious human need in research and development today is for people who can work effectively in the area where science and engineering come together — at the interface. We are short of people who have a good understanding of science and also the ability to analyze and plan the possibilities for using scientific knowledge to greatest advantage."

As technology has become more complex, the choice of the technical paths to be pursued becomes increasingly difficult. If a choice is poorly made, thousands of man-years can be wasted. The need for men who can determine how the increase in knowledge can best be assimilated, Mr. Kappel noted, presents a tremendous challenge to our universities and engineering schools.

Importance of Free Market Economy

Mr. Kappel also spoke of the importance of the free market economy in stimulating engineers to accomplish the most for the money. The market economy subjects technology to the discipline of competitive forces; requires the engineer, entrepreneur and salesman to comprehend the market and produce what people want and need; and drives toward efficiency and the survival of the fittest, Mr. Kappel said.

Leaders of government, he commented, know that what President Johnson sees as the Great Society will be created, "not out of grandiose dreams, but by the energies of hardworking individuals and organizations that set goals they truly want to work for and are willing to take risks to achieve. And in the sphere of business, I am sure real freedom to manage, to test and try, to act with venturesome spirit in the hope of reasonable reward, will be just as important to the economic success of any future Great Society as it has always been in the past."

Must Be Aware of Financial Realities

Mr. Kappel said the Bell System expects to spend in 1965 three and a half billion dollars to build new, up-to-the-minute facilities for expansion and modernization of communications services. "We expect to do this. We hope to do it. We count on doing it. At the same time, however, we must be constantly aware of financial realities. Investors, I assume, want to be members of the Great Society too, and we must keep faith with them as well as with others.

"If the zeal to restrict becomes excessive, if the reins are held overly tight, if doctrinaire and finicky ideas are allowed to be dominant, then with the best will in the world no business can give its job everything it has and make the full contribution it ought to make and wants to make."

Looking back briefly on Bell System history, Mr. Kappel emphasized that along with technical and managerial accomplishment, a sound political decision was necessary to open the way to nationwide service over a single system that would interconnect the different companies in all parts of the country.

Need Intelligent, Broad-Visioned Political Attitude

". . . It is just as important right now —today and every day—as it was 40 or 50 years ago, to have an intelligent, broad-visioned political attitude that marks out the opportunity for industrial innovation and progress. I am not thinking just about the telephone business, but of the framework of challenge and opportunity for any significant enterprise. To get effective innovation in business, to bring it about at all, we must have political thinking that opens the roads to great achievement, that sees where the public interest lies and will take down gates when they stand in the way.

". . . Effective work is best generated when goals are demanding but clear, and people can readily see their merit; when foresight is exercised and the developing situation permits sustained effort; and when scientists, managers, engineers and all concerned find common ground in the shared undertaking."

Engineers Have Political and Professional Roles

Mr. Kappel said the engineer's role is political as well as professional for he "must stand with all his strength for what he knows to be technically and intellectually right. Only by so doing can he fulfill his crucial responsibility in the joint innovating effort."

The political role of the engineer becomes increasingly important as government works increase in size and scope. For such projects, in their very nature, are attended by their own peculiar difficulties. "Shaped in the political arena, how can they fail to reflect the emotions of the electorate, the interests of sectional blocs, the dreams of leaders and the hopes of followers? And while the dreams may be vast enough, or even at times too much so, still the practical look ahead may be short as a pipestem, and the budget uncertain, and open-ended.

"So I ask myself — in the midst of these problems, how will the engineer fulfill his dual role, his professional plus his political role? Will he insist on preserving operational and engineering merit? Will he demand that we spend our substance, not on gaudy futuramas, but to build the best future we are capable of building?

"I surely hope so. The basic questions are so simple, but they cannot be ducked. First, what is needed? And second, what choices do the facts require? Those are our overwhelming concerns, and I say no minds should be more exercised to insist on right answers than the minds of engineers.

". . . We need engineering education so strong — we need faculties so strong — we need curricula so strong — that the engineer will have all the sureness of thought he needs to discharge his entire role, not just part of it. He will have the necessary character, he will have the sense of responsibility, and with these he will also have continuing command of his discipline. In short, his private talents will support his public spirit and assure his political success."

Jerry Ramsey to Teach Graduate Course in Methods Engineering

Methods Engineering (ME 490), a graduate level course, will be offered by the University of New Mexico for the first time next semester. Instructor is Jerry D. Ramsey of Value Engineering, Cost Reduction and Supplier Evaluation Division.

"The subject matter of this course is generally recognized as being in the industrial engineering and production engineering field," Jerry says. "However, it should also be of interest to the design engineer who expects to be concerned with the methods and costs of making his design," Jerry says.

The course will provide an introduction to work simplification and methods study, a systematic analysis of work to eliminate inefficient and unnecessary elements of the job. Also covered will be work measurement including time study, statistical work sampling, standard data formula construction, and predetermined synthetic time systems.

Value engineering will be covered as well as basic linear programming, queuing theory and cost estimating procedures, elements of manufacturing costs, and unit cost determinations.

The three-hour credit course will meet Tuesdays and Thursdays at 4:30 p. m.

No stranger to teaching, Jerry is a former instructor for Texas A&M and taught Industrial Engineering (ME 356) at UNM last year. He has also been an instructor in Sandia's Out-Of-Hours educational program.

TOP PERFORMANCE—Security Inspectors Mike Adams (left) and Charlie Ortiz were presented awards last week for their accomplishments in the Security organization's physical conditioning program. Mike has the top overall rating—78 points out of a possible 100. Charlie has demonstrated the greatest percentage of improvement during the past six months of the program—700 per cent. Program is conducted by Frank Treon, right. Walt Rosenburg (second from right), manager of Security Standards and Operations Department, presented the awards.

AEC Seeks Bidders For Two Projects At Sandia Laboratory

The Atomic Energy Commission has announced that bids will be invited soon from small business firms for two construction projects at Sandia Laboratory.

A storage building for irradiated material will be built for Reactor Division in Area V. The new building will be designated Bldg. 6595 and contain approximately 3050 sq. ft. with a precast, prestressed concrete roof system and non-bearing masonry walls. It will be complete with heating, plumbing and electrical connections, and a six-in. cement asbestos water line approximately 700 ft. long. R. G. Piper is the Plant Engineering Department project engineer.

Second project calls for relocating the pendulum facility used by the Field Test organization now located in Bldg. 880 to Bldg. 892. The project will include construction of a reinforced concrete frame and hollow masonry addition of approximately 1000 sq. ft. (35 ft. high) to Bldg. 892, providing connections to utility systems, and completing exterior site improvements. K. D. Harper is the Plant Engineering Department project engineer.

Take Note . . .

A "refresher course" for former square dancers is being sponsored by the Sashayer Square Dance Club. The group will meet weekly for approximately eight weeks and will be instructed by Dale Martin. The first class will be held Feb. 3 at 2633 California NE from 8-10 p.m.

Interested persons may call Art Littleford, tel. 344-3102, for more information.

* * * *

Byron Janis, popular American concert pianist, will appear with the Albuquerque Civic Symphony at the Civic Auditorium on Monday, Feb. 1.

Since his appearance at the Worlds Fair in Brussels in 1958, Mr. Janis has toured Western Europe and the Soviet Union with increasing popularity. He will appear with 14 major orchestras during his current tour of the U. S. and Canada.

* * *

"Drums along the Rio Grande" is the title of an article in the February issue of **New Mexico Magazine** written by Karl H. Zimmermann of Mod Center Division A.

The article traces the history of drums from prehistoric days to the present. Although an engineer by profession, Karl has been a drummer for some 40 years.

WALT AND BARBARA HOWERTON display trophies collected recently as winners of the local National Industrial Recreation Association's Duplicate Bridge Tournament. The tourney was played Jan. 14 at the Coronado Club.

Howertons Win Local Phase of Nat'l Bridge Tournament

Walt Howerton of Ordnance Test Projects Division II and his wife Barbara were the winners of the local National Industrial Recreation Association's Duplicate Bridge Tournament held at the Coronado Club Jan. 14. The tournament was sponsored by the Sandia Laboratory Employees Bridge Association and drew 26 pairs for competition.

Second place in the tourney was taken by Johnny Nakayama, Project Division, and Pat Waggoner, Secretarial Services Division.

Walt and his wife received trophies for the local win and will have their scores compared to others from the Sixth NIRA District for possible selection to play in the finals in Chicago Mar. 26-28. National winners will be awarded a 13-day Caribbean cruise with Charles Goren, national bridge authority.

All Sandia employees are invited to participate in bridge activities of the Association. The group meets the second Thursday of each month at the Coronado Club. Information may be obtained from Ira Holt of Engineering Aerodynamics Division, tel. 299-5943 or Joe Connell of Data Analysis and Statistical Development Division, tel. 255-3372.

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Deadline: Friday noon prior to week of publication unless changed by holiday.

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2. **One ad per issue per person**
3. **Must be submitted in writing**
4. **Use home telephone numbers**
5. **For Sandia Corporation and AEC employees only**
6. **No commercial ads, please**
7. **Include name and organization**
8. **Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.**

FOR SALE

KENMORE WASHER, $25; maple gateleg table, 2 ladderback chairs, $40; portable Singer sewing machine w/table, $55. Ogden, 242-8351.

ROBERSON 3-BDR, den, FP, 1¾ bath, double garage, pitched roof, built-in range/oven, AC, landscaped, patio, $18,800. Meyer, 298-4825.

APT. SIZE refrigerator, $20; twin bookcase bed, complete, $25; bassinett w/skirt, $6; wringer-type washer, $25; 2-piece grey living room set, $25. Browne, 344-9675.

NATIONAL NC-98 receiver W/Q-multiplier, $50; Honebrew 6-meter xmitter, modulator and converter, best offer. Anastasio, 256-3987.

PARROT, must sell because of allergies, complete with cage, six years old, large vocabulary, beautifully colored. Stiver, 265-0881.

'61 FORD Galaxie 4-dr. hardtop, V-8, power steering, power brakes, R&H. Under book. Alarid, 344-8166.

TAYLOR TOT stroller, $10; four chrome kitchen chairs, $3 each; Dejur 8mm movie camera, turret, 2 lenses, $35. Meier, 298-4698.

'60 CHEVROLET Bel-Air, 4-dr., AT, PS, PB, air, Michelin tires; Heathkit Mohican 5-band radio. Johnson, 298-4553.

CORO, 4-dr. custom, model 812 shell, Auburn 2-speed rear end, $295; Mohawk RX-1, 15-tube receiver, SSB-AM-CW, cost $299.95, sell $195. Bassett, 898-1840.

FISHING transportation, '57 Dodge Sierra wagon, PS, PB, AC, AT, R&H, $395. Martin, 299-2649.

COMMERCIAL dolly, 20"x30", $3.50; Ford boostersprings, $5; boy's leather jacket, size 16, $7; wall-type ice crusher, $3. Costello, 256-9702.

TWO 7:00x15 8-hole split-rim wheels w/commercial 6 ply nylon tires. Fisher, 299-9235.

CORRALES 3-BDR, pueblo style, carpeted, beam ceilings, 3 fireplaces, independent apt. w/kitchenette, bath, fireplace, double garage, corral, 1 acre. Swiss, 898-2083.

'40 CHEVROLET 2-dr., needs paint, $250; '35 Standard Chevrolet coupe, being restored, new engine, $350. Will trade. Boyd, 282-3331.

CALVES, Hereford (white faces) sell or trade for alfalfa, fencing material or misc. Pena, 898-0197.

EARLY AMERICAN 3-piece sectional sofa, linen covered, down filled, new cost $550, make offer. Young, 344-5651.

BEDROOM FURNITURE, vanity w/mirror, bench, chest of drawers, Hollywood bedframe, mattress, box springs; 2 maple step-tables. Waggoner, 299-9014 after 5 p.m. or weekends.

LOWREY ORGAN; 11 ft. GE chest freezer. Peeples, 877-9342.

SMITH-CORONA electric portable typewriter Electra 12, used very little, $125. Tyson, 268-1009.

6 FT. PICKUP box utility trailer w/fenders, $40; plywood cartop carrier, $10. Danclovic, 255-4927.

TWO PET RABBITS, sell or trade. Hawes, 298-8461.

'64 PONTIAC LeMans hardtop, 4-speed, air, loaded, 7250 miles, $2800; CE 100v transmitter, $300; Exercycle, $175. Smoll, 299-0023.

'59 FORD 4-dr., R&H, V-8, automatic, $450. Ezell, 268-4686.

'62 FORD Econoline, must sacrifice. Cory, 299-2635 after 5.

3-BDR, 1¾ bath, new carpeting, living, dining, and hall, walled yard, 2610 Gen. Arnold NE. Boice, 299-3260.

WINCHESTER Model 59 automatic shotgun, full choke, 28" barrel. Won in raffle, not a hunter, $135. Gladis, 299-7729.

SKI BOOTS, size 9, $10. Wagner, 268-7868.

PORTABLE water air cooler, $15. McDonnell, 268-7502 after 5:30.

SUN GLASSES, 1 pr., Ray-Ban polaroid, Air Force style, w/case, $5. Ezell, 268-4845.

MOSSMAN, 2 years old, 3-bdr., family room w/-fireplace, all brick exterior, completely landscaped, sprinklers installed. Otts, 299-3423.

3-BDR, 1¾ bath, double garage, draped, w/w carpet, fireplace in paneled den, built-in electric kitchen, NE, $20,500. Feil, 298-5104.

CORNET, Olds Ambassador w/new case, $70; Revere 500 watt 35mm slide projector, $35. Haskins, 298-1997.

'62 MONZA Spyder, black w/red interior, four on the floor, bucket seats, many extras, priced low. Scott, 243-5283.

LOS RANCHOS, Valley, 4-bdr. Territorial on 3 acres in alfalfa. Also, two horses. Property, $45,000. Gardner, 344-2547.

SEWING MACHINE, Singer, factory model 95-40, 4-ft. table, ⅓ hp motor, Koehler, 268-6930.

CROWN GRAPHIC camera, 2¼ x 3¼ with all accessories. Alvino, 255-6339.

26" BOY'S bicycle, Schwinn Wasp, chrome fenders, $18. Kreitler, 299-8494.

ELECTRIC RANGE, GE 36"; breakfast set w/six chairs, bronzetone; bed couch; three room-size wool carpets w/rubberized pads. Schaefer, 298-1041.

MUSKRAT COAT, full-length, six years old, appraised value $450, sell for $80. Barker, 299-1483.

HOUSE TRAILER, 1962 55' x 10' Marlette Expando, move and set-up included, 50-mile radius of Bernalillo. Kuidis, 264-2861.

BOY'S BIKE, $10; large trike, $5; 14' boat, 20 hp motor, trailer, $425. Pliner, 256-1907.

'57 CHEVROLET 210, 4-dr., R&H, Std. 6 cyl., $500 or best offer. Fisher, 268-3132 after 5.

FIREPLACE screen; baby bed. Anaya, 242-0837.

TWIN LENS reflex, Minolta Autocord L. Spellman, 255-8511.

TAKE OVER 23 payments of $11.50 for two cemetery lots at Sandia Memory Gardens. Brownson, Box 11371, Station E, Albuquerque, or 264-4657 after 3 p.m.

'55 BUICK Century, R&H, w/w's, $175; 3-bdr., den, 1¾ baths, fireplace, h/w floors, a/c, near schools, base, large lot, 8311 Roma NE. Bemis, 268-6376.

16" McCOLLOUGH chain saw, $35; hide away day bed, $20; 2 end and 1 coffee table, 4 folding chairs. Houghton, 299-3386.

RABBITS, pets, $1.25 each. McVeety, 299-5718.

HALLICRAFTERS S-40B short wave receiver, $25 or swap. Weinberg, 268-4728.

6-YR. BABY CRIB, mattress included, $20. Weinmaster, 298-1620.

'56 FORD station wagon, trade for '54-57 pickup or $225. Berlier, 864-8825 Belen.

'60 FORD V-8 4-dr. sedan, AT, PS, PB, AC, R&H, $750. Hunnicutt, 299-2932.

'62 CHEVY II 4-dr., R&H, 31,000 miles. Mathews, 298-7950.

GARAGE SALE of assorted den and bedroom furniture. Frankel, 298-6265.

FIVE 7:10 x 15 tires and wheels, four with only 1500 miles wear, $35; 10 x 12 wall tent w/heater, $25. Palmer, 256-3164.

ROYAL PORTABLE typewriter, magic margin control, touch control, elite type, $30. Dehon, 898-2219.

TRES PISTOLES CANYON, 2 large lots, title insurance, $2000 ea. cash, some terms available on contract. Weir, 299-1160.

BLACK MALE French poodles, AKC registered, 9 weeks old, Markowitz, 898-2326.

21" SILVERTON console TV, swivel base, w/antenna, $35. Yingst, 268-2896.

BAY MARE, 2-yr.-old, permanent registered AQHA, good show prospect, requires experienced rider; also gentle bay mare. Schooley, Los Lunas 865-9371.

'63 COUPE DE VILLE, one owner, 2-dr., original cost $7200, sell for $3800. Boyden, 268-8767.

SNOWHEIGHTS, 3-bdr., den, 1¾ baths, dining area, utility, carpeting, landscaped, below $16,000 appraisal, 2019 Somerville NE. Jones, 298-3891.

TYPEWRITER, Royal portable w/leather carrying case, $20; boy's suit, charcoal black, size 16, $10. Duvall, 299-8744.

'63 CORVAIR SPYDER, red color, $1850. Barton, 298-1240.

FIVE ACRES Tijeras canyon, access to water and electricity, $1495 per acre, terms. Cata, 255-6434.

'60 FIAT 1200 Sports car convertible, new paint upholstery and carpets, $200 below retail or best offer. Harlan, 256-0304.

L. C. SMITH standard typewriter w/cover, $25. Gregory, 268-2022.

'63 CORVAIR MONZA, white w/black vinyl interior, transistor radio, heater, 4-spd. shift, Positraction, 16 mos. old. Brown, 255-0566.

TWO AKC Basset females, one 9 weeks old, the other 18 months, both tri-color. Roark, 265-0177.

17" TV mahogany console, $30; folding fireplace screen black, $3. Erni, 255-8350.

'59 FIAT, red convertible, R&H, recently overhauled, $650. Kraft, 299-5550.

ROCKING HORSE; cat's scratching post; dog basket; reclining board; child's training chair; wheelbarrow; garden hoses; misc. garden tools. Miller, 268-5577 after 5:30.

SET OF STD. PISTONS, valves, hydraulic lifters, and cam for 283 Chevy; also parts for Volvo PV444 engine. Wilson, 298-0049.

NE HEIGHTS, 3-bdr., 1¾ baths, fireplace, central heat, a/c, landscaped, built-ins, $750 down, $100/mo. Carlton, 299-6041.

FREE, PUPPY, 4-mos. old, mostly German Shepherd, house broken. Newton, 299-1283.

MOTORCYCLE, '61 Mustang, recently overhauled. Bureta, 256-1833.

SOFA BED and matching chair, contemporary finish, make offer, 313 Erbbe St. NE. Orth.

'63 CHEV. IMPALA, 2-dr., 327 cu. in. engine, R&H, automatic, below NADA. Steele, 299-9117.

BOXER PUPPIES, AKC registered litter, championship lines, 3 males. Gall, 898-2937.

WANTED

TRADE RIDES or ride with someone, 1513 Maxine NE area, to and from Bldg. 805. Blakey, 298-0511.

JOIN OR FORM car pool from Inez addition or Hoffmantown to East end of Tech Area I. Nevin, 298-0383.

USED SADDLE, not fussy about type or condition. Netz, 282-3607.

SET of rumble seat cushions for 1930 Model A Ford. Ingram, 344-5756 after 5.

TRADE wood bow, not recurved, 42 lbs., for lighter bow, about 35 lbs. Williams, 298-2671.

LADY'S BICYCLE, very good condition. Avallone, 256-0403.

RIDE from Cagua NE to Bldg. 880. Wagner, 268-7868.

CONCRETE MIXER; small monaural amplifier. Abrams, 344-8252.

COPY OF FIELDS AND WAVES IN MODERN RADIO by Ramo Whinnery, 2nd. edition. Navratil, 299-3355 after 5.

TRADE boy's 20" bicycle for girl's 20" bicycle. Arning, 256-9229.

FOSTER MOTHER for 7 children, ages 6 through 19, Inez addition location; at least until June 1965. Snowdon, 298-2190.

HAMSTER and cage. Windham, 256-9455.

FOR RENT

NEW 3-bdr. furnished apt., 1¾ bath, electric kitchen, CFA heat, a/c, carpets, drapes, garage, private yard, $135. Stone, 298-4620.

ROOM and garage near bases. Pouliot, 299-0492.

LARGE ROOM, completely private entrance, bath, and lawn, Hoffmantown. Bascom, 299-1662.

LOST AND FOUND

LOST—4 keys on chain, 4 keys on ring, man's tan deerskin glove, lady's Bulova wrist watch, car keys w/name tag, contact lenses in green case, man's bi-focal glasses. LOST AND FOUND, tel. 264-2757.

FOUND—Man's tan jacket, Timex watch, black pigskin gloves, 3 keys on ring, leather case for glasses, single car key on chain w/good luck charm, single car key, pipe. LOST AND FOUND, tel. 264-2757.

A Sandia Innovation . . .

ASP Generator Converts Energy Of Reentry into Usable Power

Now awaiting its first practical flight test, a new device developed by Sandia Laboratory's Aerodynamic Research Division promises to provide additional power without additional weight to reentry vehicles.

The device is called an ASP (for Aerodynamic Source of Power) generator. It has been under development and laboratory testing for two years.

Ken Touryan of Aerodynamic Research Division performed the research leading to the development of the ASP generator. Dave McVey of Aero Design Division is the designer of the prototype model and project engineer.

Purpose of the ASP is to convert the heat generated during reentry into high current electrical power without intermediate mechanical conversion.

As a nose cone reenters the atmosphere at hypersonic velocity, the covering material emits a stream of electrons which flow through the surrounding plasma to the rear of the vehicle. (Plasma is a fourth state of matter which is formed at high temperatures. Matter can be a solid, melted to a liquid, then to a gas, and finally to the plasma state which is a high temperature mixture of charged particles —ions and electrons. The atmosphere heats to a plasma state when a missile reenters.)

By separating (with an insulating material) the forward area of the nose cone from the rear portion and then connecting the areas with an internal electrical load, a plasma diode can be formed.

During reentry, the forward portion of the nose functions as an emitter. As the heat forces the plasma to form, electrons stream from the surface of the emitter. Because of its lower temperature and larger surface area, the rear of the nose cone becomes a collector. Physically, the ASP generator operates as a thermocouple with the plasma functioning as one branch and the emitter-collector as the other.

Output of the generator depends on the material used for the emitter and collector, size and shape of the device, speed and temperature achieved during reentry, and the length of time plasma is generated which results from the angle of the reentry trajectory.

As much as 30 amps per sq. in. of emitter surface was obtained during testing of small models in Sandia's plasma jet facility. Various materials and design configurations were tested. Results show that pyrolytic graphite, a feasible nose cone material, would make the best plasma generator. The addition of cesium to the graphite produces a "seeded" plasma and boosts the electron output. Phenolic impregnated with carbon, a common nose cone material, also functions as a good material for the ASP generator.

Based on test results, Ken Touryan believes that an ASP generator incorporated into the design of a three-ft.-diameter reentry vehicle could produce up to 1000 watts of power.

"The theory and design parameters of the generator were proved in more than 50 tests in the plasma jet laboratory." Ken says. "We know the ASP will work, but we do need a practical test. The prototype unit is now being scheduled for a practical flight test possibly next month."

The prototype is a small (five-in.-diameter, 20-in.-long) unit. It will separate from the missile during reentry. Fully instrumented, the prototype's performance will be monitored and measured and the data relayed by a telemetry package designed by C. A. Loveless, Jr. and R. A. Pearson of Livermore Laboratory's Test Projects Division.

If the ASP generator principle was designed into the nose cone of a full-size reentry vehicle, it would provide additional power without additional weight. It would utilize the otherwise wasted thermal energy of reentry.

The power could be used for any number of applications, Ken believes. It could power internal components or provide simply an auxiliary power source for emergency use. ASP-generated energy could be stored by capacitors on board the reentry vehicle.

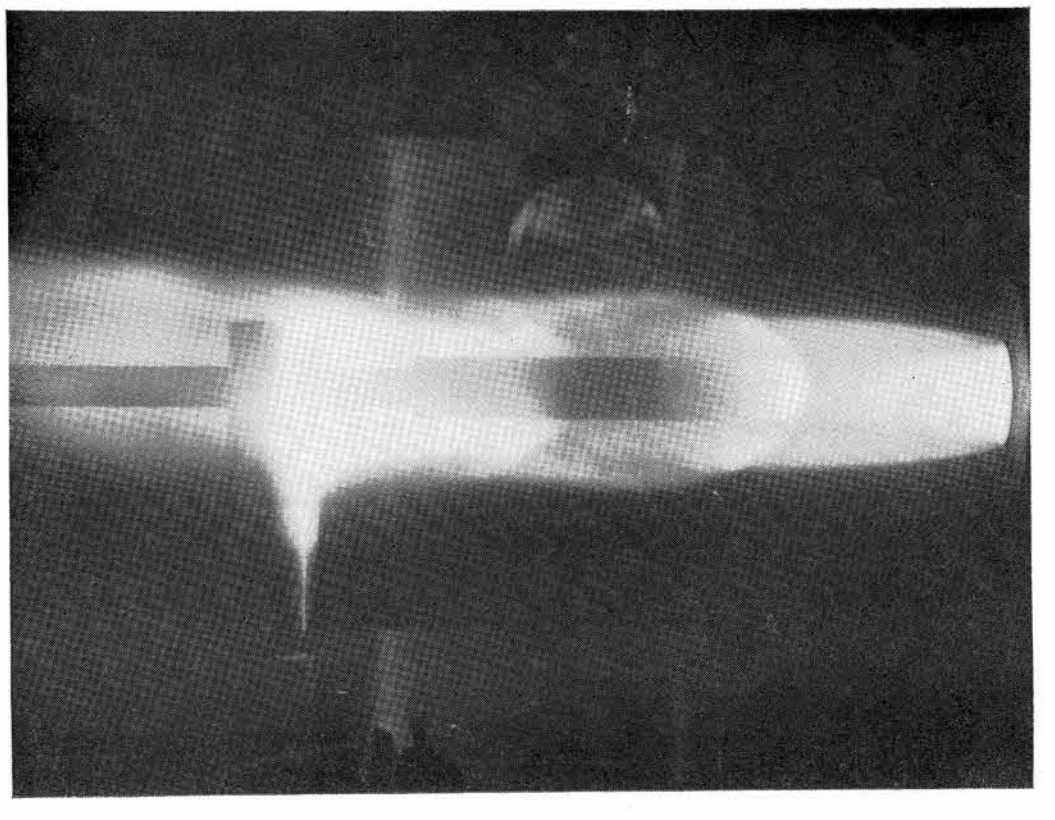
Another possible application of the ASP energy is to use it to energize a magnetic coil which in turn would interact with the plasma around the reentry vehicle and damp out the oscillations of the vehicle induced by reentry instabilities.

"This is a 'far-out' application," Ken says, "but we're researching the idea now."

Detailed technical description of the ASP generator is available in two Sandia publications — "Hypersonic Plasma Converter I," SC 4690 (RR) and "Hypersonic Plasma Converter II," SC-RR-64-979. The device will also be described in an article to appear in the **American Institute of Aeronautics and Astronautics Journal** next April.

ASP GENERATOR DEVELOPERS—Dave McVey, left, and Ken Touryan discuss results of testing more than 50 models in Sandia's plasma jet laboratory. Tests show that special materials and design configurations in a re-entry vehicle nose cone can produce up to 1000 watts of power without adding additional weight to the vehicle. In background is the plasma jet test chamber with some of the models tested.

PLASMA JET test of an ASP generator design shows glowing emitter portion at the front of the nose cone and cooler collector section at the rear. Also visible is the shock wave in the plasma stream which is entering the test chamber from the right. Emitter and collector areas are connected by an internal rod through the separating insulator which completes a load circuit. Up to 30 amps of power per sq. in. of emitter surface is created during reentry.



150 Junior High Students to Visit Sandia Laboratory on Edison Day

Sandia Laboratory will have as guests Feb. 11, 150 ninth-grade students from the Albuquerque area commemorating the 118th anniversary of the birth of Thomas A. Edison.

Sandia is participating at the request of the Atomic Energy Commission, a cooperating agency in the annual International Science Youth Day sponsored by the Thomas Alva Edison Foundation. It will be the ninth consecutive year that the Company has taken part in the observance.

Last year, more than 4500 students visited 12 facilities across the country.

The 1965 program at Sandia marks the first time junior high school students have been invited on the unclassified tour. The program was limited to high school students in the past.

Three pupils and one adult adviser from each of 19 Albuquerque junior highs have been invited, along with delegates from eight private and parochial schools in the city and 11 public schools outside the city.

In addition to the 19 Albuquerque junior high schools, taking part for the first time will be ninth graders from Laguna Acoma, LaJoya, Bernalillo, and Albuquerque Lourdes.

The Youth Day tours will be run in two sections: the first beginning at 8:15 a.m., the second at 12:30 p.m. After a movie and a brief talk by H. D. Sivinski on "Materials and Processes in the Space Environment" at the Sphere of Science, the students will observe special demonstrations and exhibits.

Sandia Speakers

J. P. Brannen of Systems Analysis Division II, "On the Extrema of a Class of Weierstrass Transforms," 71st annual American Mathematical Society meeting, Jan. 26-30, Denver, Colo.

D. R. Morrison of Computer Mathematics Division, "The Theory of Cones," American Mathematical Society meeting, Jan. 26-30, Denver, Colo.

P. E. Waltman of Applied Mathematics Division, "On the Convergence of Solutions of the Forced Lienard Equation," American Mathematical Society meeting, Jan. 26-30, Denver, Colo.

A. R. Sattler of Crystal Lattice Defects Division, "Ionization by Energetic Silicon Atoms within a Silicon Lattice," and "The Channeling of Ions Through Single Crystal Silicon Lattices," seminar at Electro Optical Systems Inc., Nov. 25, Pasadena, Calif.

N. J. DeLollis of Special Materials Division, "Production Plastics Bonding Procedures," Industrial Adhesives for Metal and Plastics Engineering Instiute, Feb. 11-13, Madison, Wis. Mr. DeLollis will also preside at one of the sessions and will participate in a forum discussion of "Problems in Adhesive Bonding of Metal and Plastics."

Welcome Newcomers

Jan. 11 - 22

Albuquerque	
Mary M. Anderson	3126
Oletha M. Cox	4211
Martha R. Craig	3126
Mary E. Hibbetts	3421
Nancy L. Moran	3412
Margaret Ringer	3126
Barbara R. Saya	3153
Prospero Toledo	4574
Vera May Tuttle	3126
Harold R. Wallace	3413
California	
Amado A. Trujillo, Carmichael	7422
Illinois	
Paul W. Cooper, Chicago	1312
New York	
William A. Millard, Saratoga Springs	9322
Virginia	
Phil E. Harrison, Hampton	3312

Sandia's Safety Scoreboard

Sandia Laboratory:

11 DAYS
385,000 MAN HOURS
WITHOUT A
DISABLING INJURY

Livermore Laboratory:

160 DAYS
807,700 MAN HOURS
WITHOUT A
DISABLING INJURY